

SAWAGUCHI *et al.*, SN 10/823,560
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IN THE CLAIMS:

1.-14. (Cancel)

15. (New) A signal processing apparatus for a perpendicular magnetic recording/reproducing apparatus, comprising:

a partial-response equalization circuit including a digital filtering circuit having DC-null frequency characteristics cutting off low frequency signal components inclusive of DC components; and

a maximum likelihood decoder,

wherein a reproduced signal is reproduced by said partial-response equalization circuit and then inputted into said maximum-likelihood decoder to be reproduced into a recording data sequence.

16. (New) The signal processing apparatus according to Claim 15, comprising a magneto-resistive sensor to reproduce and output a signal of a perpendicular magnetic recording medium having a soft under layer.

17. (New) The signal processing apparatus according to Claim 15, wherein a length n of an intersymbol interference is settable at longer than a five-bit interval for said partial-response equalization circuit and/or said maximum likelihood decoder.

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18. (New) The signal processing apparatus according to Claim 15, comprising a register circuit to set up an amplitude ratio of an intersymbol interference and/or a length n of the intersymbol-interference out.

19. (New) The signal processing apparatus according to Claim 15, wherein reproduced signal waveforms corresponding to a pair of a closest two recording transitions recorded on a recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of $(a_1, a_2, a_3, \dots, a_k, \dots, a_n)$ (In which k is an integer indicating a bit-interval, and $a_1 \dots a_n$ are non-zero real numbers satisfying a relation: $a_1 + a_2 + a_3 \dots + a_k + \dots + a_n = 0$) at each bit-interval time through said partial-response equalization circuit, and wherein said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

20. (New) The signal processing apparatus according to Claim 15, wherein reproduced signal waveforms corresponding to a pair of a closest two recording transitions recorded on a recording medium at a shortest bit-length interval are outputted as signal waveforms having intersymbol interference of an amplitude ratio of $(a_1, a_2, a_3 - a_1, \dots, a_k - a_{k-2}, \dots, a_n - a_{n-2}, -a_{n-1}, -a_n)$ (in which k is an integer indicating a bit-interval and $a_1 \dots a_n$ are non-zero real numbers) at each bit-interval through said partial-response equalization circuit, and wherein said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

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21. (New) The signal processing apparatus according to Claim 19, wherein $a_1 \dots a_n$ are non-zero real numbers satisfying the relation $n \geq 3$ at each bit-interval through said partial-response equalization circuit.

22. (New) The signal processing apparatus according to Claim 21, wherein a_1 , a_2 and a_3 take an integer ratio of $a_1 = 4$, $a_2 = 3$ and $a_3 = 2$.

23. (New) The signal processing apparatus according to Claim 21, wherein said partial-response equalization circuit is constituted by a transversal filter in which filter tap coefficients are changed or adjusted so that a sum of said tap coefficients is zero.

24. (New) The signal processing according to Claim 22, comprising a signal processing circuit wherein said signal processing circuit is mounted on a semiconductor integrated circuit.

25. (New) The signal processing apparatus according to Claim 24, wherein said semiconductor integrated circuit is mounted on said perpendicular magnetic recording/reproducing apparatus.

26. (New) The signal processing apparatus according to Claim 23, comprising a signal processing circuit wherein said signal processing circuit is mounted on a semiconductor integrated circuit.

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27. (New) The signal processing apparatus according to Claim 26, wherein said semiconductor integrated circuit is mounted on said perpendicular magnetic recording/reproducing apparatus.

28. (New) The signal processing apparatus according to Claim 15, wherein said partial response equalization circuit has a DC-null frequency characteristic of not passing low-frequency signal components inclusive of DC components.

29. (New) A signal processing apparatus for a perpendicular magnetic recording/reproducing apparatus, comprising:

a partial-response equalization circuit having frequency characteristics cutting off low-frequency signal components inclusive of DC components; and

a maximum likelihood decoder,

wherein a reproduced signal is reproduced by said partial-response equalization circuit and then inputted into said maximum-likelihood decoder to be reproduced into a recording data sequence.

30. (New) The signal processing apparatus according to Claim 29, comprising a magneto-resistive sensor to reproduce and output a signal of a perpendicular magnetic recording medium having a soft under layer.

31. (New) The signal processing apparatus according to Claim 29, wherein reproduced signal waveforms corresponding to a pair of a closest two recording transitions recorded on a recording medium at a shortest bit-length interval are

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outputted as signal waveforms having Intersymbol Interference of an amplitude ratio of $(a_1, a_2, a_3, \dots, a_k, \dots, a_n)$ (in which k is an integer indicating a bit-interval, and $a_1 \dots a_n$ are non-zero real numbers satisfying the relation: $a_1 + a_2 + a_3 \dots + a_k + \dots + a_n = 0$) at each bit-interval time through said partial-response equalization circuit, and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

32. (New) The signal processing apparatus according to Claim 29, wherein reproduced signal waveforms corresponding to a pair of a closest two recording transitions recorded on a recording medium at a shortest bit-length interval are outputted as signal waveforms having Intersymbol Interference of an amplitude ratio of $(a_1, a_2, a_3 - a_1, \dots, a_k - a_{k-2}, \dots, a_n - a_{n-2}, -a_{n-1}, -a_n)$ (in which k is an integer indicating a bit-interval, and $a_1 \dots a_n$ are non-zero real numbers) at each bit-interval through said partial-response equalization circuit, and said reproduced signal waveforms are inputted into said maximum-likelihood decoder for data reproduction.

33. (New) The signal processing apparatus according to Claim 31, wherein $a_1 \dots a_n$ are non-zero real numbers satisfying a relation $n \geq 3$ at each bit-interval through said partial-response equalization circuit.

34. (New) The signal processing apparatus according to Claim 33, wherein a_1, a_2 and a_3 take an integer ratio of $a_1 = 4, a_2 = 3$ and $a_3 = 2$.

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35. (New) The signal processing apparatus according to Claim 33, wherein said partial-response equalization circuit is constituted by a transversal filter in which filter tap coefficients are changed or adjusted so that a sum of said tap coefficients is zero.

36. (New) The signal processing apparatus according to Claim 34, comprising a signal processing circuit wherein said signal processing circuit is mounted on a semiconductor integrated circuit.

37. (New) The signal processing apparatus according to Claim 36, wherein said semiconductor integrated circuit is mounted on said perpendicular magnetic recording/reproducing apparatus.

38. (New) The signal processing apparatus according to Claim 35, comprising a signal processing circuit wherein said signal processing circuit is mounted on a semiconductor integrated circuit.

39. (New) The signal processing apparatus according to Claim 38, wherein said semiconductor integrated circuit is mounted on said perpendicular magnetic recording/reproducing apparatus.

40. (New) The signal processing apparatus according to Claim 29, wherein said partial response equalization circuit has a DC-null frequency characteristic of not passing low-frequency signal components inclusive of DC components.